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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/580,317

05/23/2006

Hans Sigrist

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10/01/2009

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EXAMINER

CLARK, GREGORY D

ART UNIT

PAPER NUMBER

1794

NOTIFICATION DATE

DELIVERY MODE

10/01/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentmail@whda.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/580,317	<b>Applicant(s)</b> SIGRIST ET AL.	
	<b>Examiner</b> GREGORY CLARK	<b>Art Unit</b> 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>05/25/2006</u> .  | 6) <input type="checkbox"/> Other: ____.                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. **Claims 1-11 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sigrist (WO 02/055593) in view Bergstrom (US 5,242,828).**

2. **Regarding Claims 1 and 8,** Sigrist discloses a photolinker molecule that contains photoactivable groups apt to be activated at a wavelength of 350nm (page 4, lines 9-10) and a sulfur-containing groups that include thiols (-SH) (page 10, line 11). The applicant claims an activation wavelength of at least 320nm.

Sigrist also discloses that the photolinker molecule can be used improve the biocompatibility of medical devices and bioanalytical systems which includes biosensor analysis platforms (abstract). Sigrist fails to mention the photolinker molecule attached to a metallic surface.

Bergstrom discloses a sensing surface (analysis platform) suitable for use in a biosensor that includes a film of metal selected from copper, silver, aluminum and gold

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(abstract). In order to render such surfaces suitable for binding biospecific ligands (biomolecule) a monolayer of an organic molecule represented by X-R-Y is applied to the metal surface (column 4, lines 19-22). Bergstrom discloses that a biosensor surface (analysis platform) at the time of the invention was understood to also include metal surfaces.

- X functionality binds to the metal (column 4, lines 34-35) and includes asymmetrical or symmetrical disulfide (--SSR'Y', -SSRY, sulfide (-SR'Y', -SRY), thiol (-SH), isothiocyanate, thiocarbamate, thio acid and dithio acid (-COSH, -CSSH) (column 4, lines 41-48). (similar sulfur based moieties as the applicant).
- R is a hydrocarbon chain that can contain heteroatoms (column 4, lines 50-51).
- Y serves as a coupling group to bind to ligands (column 4, line 35)

The X-R-Y material of Bergstrom is a type of bifunctional molecule used to i) attach the bifunctional molecule to the sensing surface (analysis platform) and to ii) bind the bifunctional molecule to the ligand (biomolecule). Both Bergstrom and Sigrist teach bifunctional molecules that have biocompatibilizing utility for biosensors surfaces.

Moreover, Bergstrom and Sigrist also teach a similar manners to attach the bifunctional molecule to the sensing surface (analysis platform) via sulfur based functional groups.

The examiner takes the position that the biocompatibility of biosensor analysis platforms disclosed by Sigrist is analogous to the biocompatibility of a biosensor sensing surface disclosed by Bergstrom. At the time of the invention, Bergstrom shows

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that biosensor surfaces were inclusive of metal surfaces and bifunctional molecules with sulfur based functionality were effective at establishing attachment to the said metal surface.

With the expectation of success, it would have been obvious to a person of ordinary skill in the art at the time of the invention to have selected from known approaches to render a biosensor surface (analysis platform) with metal surfaces biocompatible which would have included bifunctional molecule with sulfur based anchoring groups such as those disclosed Sigrist and Bergstrom. The thiol based photolinker of Sigrist would have been recognized to have utility in the area of biocompatibilizing of a biosensor surface (analysis platform) based on the teaching of Bergstrom.

3. **Regarding Claim 2**, Sigrist discloses that the photolinker molecule is covalently bonds to organic material (page 3, line 15) such as antigens (biomolecule) (page 4, lines 29-30).

The examiner takes the position that the antigens are in the active form.

4. **Regarding Claims 3-4 and 14-15**, Sigrist discloses that the photolinker molecule is made from derivatives of polysaccharides such as aminodextran (page 3, lines 33-34 and page 4, line 1).

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5. **Regarding Claims 5 and 16**, Sigrist discloses that the photolinker molecule is made from derivatives of polysaccharides such as aminodextran. Sigrist fails to mention the total amino functions for subsequent functionalization with the photoactivatable groups and the sulfur-containing groups being 0.01 to 0.5 mol per mol glucose monomer.

The examiner takes the position that the level of amino functionality would be adjusted to ensure that after functionalization there was a suitable level of photoactivatable groups and the sulfur-containing groups to achieve sufficient anchorage to the surface and adequate bonding to the target biomolecule. In cases where the level of the functional groups was too low poor adhesion to the surface (i.e. medical device) would be expected along with poor adhesion to the surface (i.e. medical device).

With a reasonable expectation of success, it would be obvious for a person of ordinary skill in the art at the time of the invention to adjust the amino level in the dextran polymer to ensure that after functionalization with the photoactivatable groups and the sulfur-containing groups there was suitable adhesion to the surface (i.e. medical device) and adequate bonding to the target biomolecule which would have included the claimed range.

6. **Regarding Claims 6 and 7**, Sigrist discloses that the photoactivatable group include aryl diazirines (page 4, line 5) and benzophenone-4-isothiocyanate (page 4, line 3).

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7. **Regarding Claim 9**, Sigrist discloses that the photolinker molecule can be used in biosensor (abstract).

8. **Regarding Claim 10**, Sigrist discloses that the photolinker molecule can be used on a heterogeneous affinity arrays.

The examiner takes the position that heterogeneous affinity arrays are inclusive of a microarray using the photolinker molecule.

9. **Regarding Claim 11**, Sigrist discloses that the photolinker molecule can be used in microcontract printing.

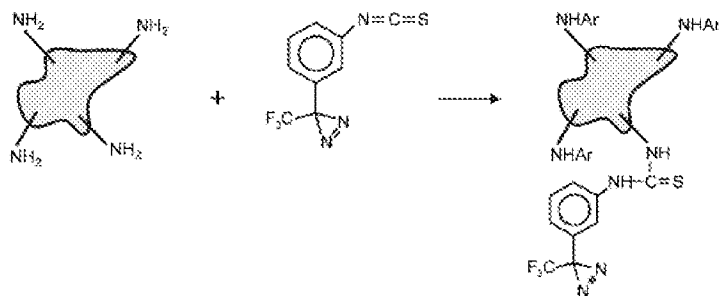
The examiner takes the position that microcontract printing is inclusive of a nanoassembly using the photolinker molecule.

10. **Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sigrist (WO 02/055593) in view of Fengting (chemical Physics Letters, 264, 1997, p.376-380) and Berie (Biosensors and Bioelectronics 16, 2001, p. 979-987) and Carlsson (Biochemistry J., 1978, 173, (. 7230737).**

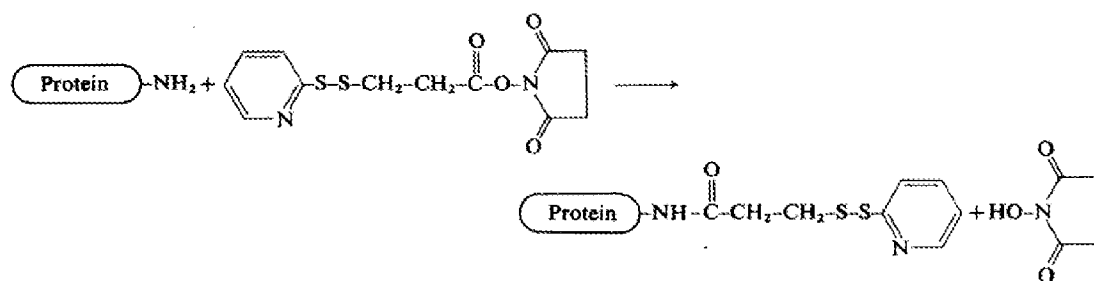
11. **Regarding Claims 12 and 13**, Sigrist discloses does not discloses the method by which the amino-dextran polymer (polysaccharide) is functionalized with the photoactivable groups and the sulfur containing groups.

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Berie discloses that derivatizing an amino functional resin with benzophenone-4-isothiocyanate is a common procedure to produce an aryldiazirine derivative. See scheme 1 below:



Carlsson shows that derivatizing an amino function resin with (N-succinimidyl 3-(2-pyridyldithio) propionate is a common procedure to product a disulfide derivative (sulfur containing group) (per claim 13). See scheme 2 below:



The examiner takes the position that a skilled artisan would simply apply the procedure of Berie and Carlsson in sequences to achieve multiple substitutions with photoactivable groups and sulfur containing groups.

With a reasonable expectation of success, it would have been obvious to a person of ordinary skill in the art at the time of the invention to sequentially functionalize



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an amino-dextran resin with a photoactivable groups such as an aryldiazirine derivative disclosed by Berie and a sulfur containing group disclosed by Carlsson since such approaches were readily available at the time of the invention.

As discussed above, Sigrist discloses a photolinker molecule that contains photoactivable groups apt to be activated at a wavelength of 350nm (page 4, lines 9-10). The applicant claims at least 320 nm. (per claim 13).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GREGORY CLARK whose telephone number is (571)270-7087. The examiner can normally be reached on M-Th 7:00 AM to 5 PM Alternating Fri 7:30 AM to 4 PM and Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on (571) 272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/  
Supervisory Patent Examiner, Art Unit 1794

GREGORY CLARK/GDC/  
Examiner  
Art Unit 1794